

C.1 SMALL PROJECT DRAINAGE REVIEW REQUIREMENTS

Small Project Drainage Review is required for any proposed *single family residential project* or *agricultural project* that results in 2,000 square feet or more of *new impervious surface* or 35,000 square feet or more of *new pervious surface*, and meets one of the following criteria:

- The project will result in no more than 10,000 square feet of **total impervious surface** added on or after January 8, 2001 (the effective date of the Endangered Species Act “take prohibition” issued by the Federal government to protect Puget Sound Chinook Salmon) and no more than 35,000 square feet of *new pervious surface* (for *sites* zoned as RA, F, or A, this *new pervious surface* threshold may be increased to 70,000 square feet or 35% of the *site*, whichever is greater), OR
- The project will result in no more than 4% **total impervious surface** and 15% *new pervious surface* on a single parcel *site* zoned as RA or F, or on a single or multiple parcel *site* zoned as A, AND all impervious surface area, except 10,000 square feet of it, will be set back from its natural location of discharge from the *site* at least 100 feet for every 10,000 square feet of **total impervious area**.

Note: for the purposes applying this threshold to a proposed single family residential subdivision (i.e., plat or short plat project), the impervious surface coverage assumed on each created lot shall be 4,000 square feet (8,000 square feet if the site is zoned as RA) or the maximum allowed by KCC 21A.12.030, whichever is less. A lower impervious surface coverage may be assumed for any lot in which the lower impervious surface coverage is set as the maximum through a declaration of covenant recorded for the lot. Also, the new pervious surface assumed on each created lot shall be the entire lot area, except the assumed impervious portion and any portion in which native conditions are preserved by a clearing limit per KCC 16.82, a covenant or easement recorded for the lot, or a tract dedicated by the proposed subdivision.

All projects subject to Small Project Drainage Review must comply with the following two basic mitigation requirements in this appendix:

1. Apply **flow control BMPs** to developed surfaces as directed in Section C.1.3 (p. C-13), and
2. Apply **erosion and sediment control (ESC) measures** to disturbed areas during construction as directed in Section C.1.4 (p. C-20).

To show how these requirements will be met, project applicants must submit drainage plans and supporting documentation as directed in Section C.1.5 (p. C-21).

In addition, some small projects may have *site-specific* or project-specific drainage concerns or requirements that must be addressed by a *civil engineer* or County engineering review staff. Examples include the presence of flood, erosion, or landslide hazards on or near the *site*, safe conveyance of stormwater through the *site*, and application of special drainage requirements. The County will identify any such issues during Small Project Drainage Review and will require a separate **Targeted Drainage Review** in addition to Small Project Drainage Review to address them (see Section C.1.2, p. C-9). This may require the additional submittal of *site* information, reports, and/or engineering plans signed and stamped by a *civil engineer*. For more information on how Targeted Drainage Review relates to Small Project Drainage Review, see Reference Section C.5.1 (p. C-101).

Use Section C.1.1 (below) to determine the scope of requirements, if any, that must be addressed by a *civil engineer* and/or County engineering review staff under Targeted Drainage Review, and learn where to look to determine the scope of requirements for application of flow control BMPs and ESC measures and submittal of information necessary for Small Project Drainage Review.

C.1.1 PROCEDURE FOR DETERMINING REQUIREMENTS

The following questionnaire/flow chart (Table C.1.1.A) is intended to be a guide for determining the scope of requirements that will apply to a project in Small Project Drainage Review, and Targeted Drainage Review if applicable. It will refer or direct you to more specific information on the application of requirements found in subsequent subsections, and in some cases, King County Code.

TABLE C.1.1.A QUESTIONNAIRE/FLOW CHART FOR DETERMINING REQUIREMENTS			
No.	Question	If YES	If NO
1.	Is the proposed project subject to drainage review as determined by consulting <i>DDES</i> ² or Section 1.1.1 of the <i>SWDM</i> .	Go to the next question.	The project does not need to meet the requirements of the <i>SWDM</i> or this appendix.
2.	Is the project subject to Small Project Drainage Review as determined in Section C.1 (p. C-5) and confirmed with <i>DDES</i> ?	Step through the following questions to (1) determine the scope of requirements, if any, that must be addressed by a civil engineer and/or <i>DDES</i> under Targeted Drainage Review, and (2) learn where to look to determine the scope of requirements for application of flow control BMPs and ESC measures and submittal of information necessary for Small Project Drainage Review.	Full Drainage Review, Targeted Drainage Review, or Large Project Drainage Review is required as specified in the <i>SWDM</i> , and engineering plans signed and stamped by a civil engineer must be submitted to <i>DDES</i> . Use the <i>SWDM</i> and not this appendix to determine drainage review requirements.
3.	Does the site contain or is it adjacent to a flood hazard area as determined by <i>DDES</i> through a "critical area review" per KCC 21A.24.100?	A notice on title will be required as specified in KCC 21A.24.170 and associated public rule, and any proposed structures or substantial improvements within the 100-year floodplain will require a FEMA Elevation Certificate completed by a civil engineer or land surveyor per KCC 21A.24.270. See Section C.1.2.1 (p. C-10) for further details. Go to the next question.	Skip to Question 7 (p. C-8).

² *DDES* means the King County Department of Development and Environmental Services, which is the department responsible for conducting drainage review of proposed projects that are subject to a King County development permit or approval. Applicants for a permit or approval should contact *DDES* permit review staff prior to submittal to determine/confirm that drainage review is required, and if so, what type of drainage review is appropriate. Applicants may also arrange a predesign meeting with *DDES* permit review staff to confirm the type of drainage review and scope of drainage requirements that apply to the proposed project.

- c) The **slope** of the flowpath segment must be no steeper than 15% for any 20-foot reach of the flowpath segment.
 - d) The flowpath segment must be located between the dispersion device and any **downstream drainage feature** such as a pipe, ditch, stream, river, pond, lake, or wetland.
 - e) The flowpath segments for adjacent dispersion devices must be sufficiently spaced in order to prevent overlap of flows in the segment areas. The **minimum spacing** between flowpath segments is specified for each dispersion device in subsequent sections, and includes an exception made in cases where sheet flow from a non-native pervious surface overlaps with other flowpath segments.
4. For *sites* with **septic systems**, the discharge of runoff from dispersion devices must be located down slope of the primary and reserve drainfield areas. DDES permit review staff can waive this requirement if site topography clearly prohibits discharged flows from intersecting the drainfield.
 5. Dispersion devices are not allowed in critical area **buffers** (unless approved by DDES) or on **slopes** steeper than 20%. Dispersion devices proposed on slopes steeper than 15% or within 50 feet of a **steep slope hazard area** or **landslide hazard area** must be approved by a **geotechnical engineer** or **engineering geologist** unless otherwise approved by the DDES staff geologist.
 6. The dispersion of runoff must not create **flooding or erosion impacts** as determined by the DDES. If runoff is discharged toward a **landslide hazard area**, **erosion hazard area**, **steep slope hazard area**, or any slope steeper than 15%, DDES may require evaluation and approval of the proposal by a **geotechnical engineer** or **engineering geologist**.

C.2.1.2 DELINEATION OF NATIVE VEGETATED AREA FOR FULL DISPERSION

The area of **native vegetated surface** used for full dispersion must be delineated as a "**native growth retention area**" on the flow control BMP site plan that will be attached to the required declaration of covenant and grant of easement per Requirement 3 of Section C.1.3.3. Delineation of the native growth retention area is subject to the following **restrictions**:

1. The principle restriction on native growth retention areas is **removal of vegetation and trees**. All trees within the native growth retention area at the time of permit application shall be retained, aside from approved timber harvest activities and the removal of dangerous and diseased trees.
2. The native growth retention area may include any *unsubmerged*¹⁵ critical areas and any critical area buffers.
3. The native growth retention area may include previously cleared areas replanted by the proposed project in accordance with the **native vegetated landscape** specifications in Section C.2.1.8 (p. C-35).
4. The native growth retention area **may be used for passive recreation** and related facilities, including pedestrian and bicycle trails, nature viewing areas, fishing and camping areas, and other similar activities that do not require permanent structures, provided that cleared areas and areas of compacted soil associated with these areas and facilities do not exceed eight percent of the native growth retention area.
5. The native growth retention area **may contain utilities and utility easements**, including other flow control BMPs, but not septic systems.

Note: the Public Benefit Rating System (PBRs) provides tax credit for properties that preserve 4 acres or more of contiguous open space in rural areas. Additional credits are granted under the forested open space category, provided a Forest Management Plan is developed that maintains the open space in a fully forested condition.

¹⁵ *Unsubmerged* means outside the ordinary high water mark of streams, lakes, and wetlands.

C.2.1.3 USE OF SPLASH BLOCKS FOR FULL DISPERSION

Splash blocks such as that shown in Figure C.2.1.A (p. C-30) may be used to disperse the runoff collected from small amounts of roof area and discharged via a downspout.

Design Specifications

1. No more than 700 square feet of roof area may be drained to a single splash block unless the native vegetated flowpath segment is longer than the 100-foot minimum length specified in Minimum Requirement 3 of Section C.2.1.1.
2. A maximum roof area of 1,400 square feet may be discharged to a single splash block if the native vegetated flowpath segment is at least 200 feet in length. *Note: for roof areas larger than 700 square feet, the splash block should be located away from building or other provisions should be made to prevent flooding/erosion problems.*
3. For roof areas of between 700 square feet and 1,400 square feet, the length of the flowpath segment may vary proportionally between 100 and 200 feet.
4. For purposes of maintaining adequate separation of flows discharged from adjacent dispersion devices, the native vegetated flowpath segment for the splash block must have at least 50 feet of separation from an adjacent flowpath segment at the downstream end of whichever segment is the shorter. **Exception:** where sheet flow from a non-native pervious surface overlaps with the flowpath of a splash block, the splash block flowpath segment must be extended at least 1 foot for every 3 feet of non-native pervious surface area **width** draining to the same flowpath. *Note that width is measured in the general direction that runoff flows across the non-native pervious surface.*

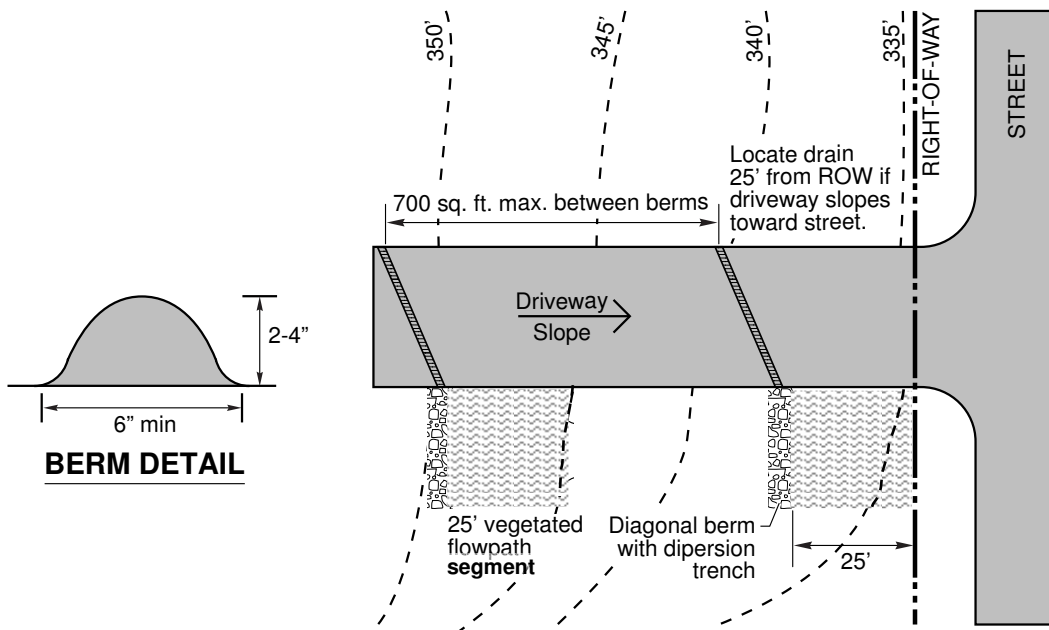
C.2.1.4 USE OF ROCK PADS FOR FULL DISPERSION

Pads of crushed rock, 2 feet wide (perpendicular to flow) by 3 feet long by 6 inches deep, may be used as a dispersion device to discharge small amounts of concentrated runoff from impervious surface or non-native pervious surface.

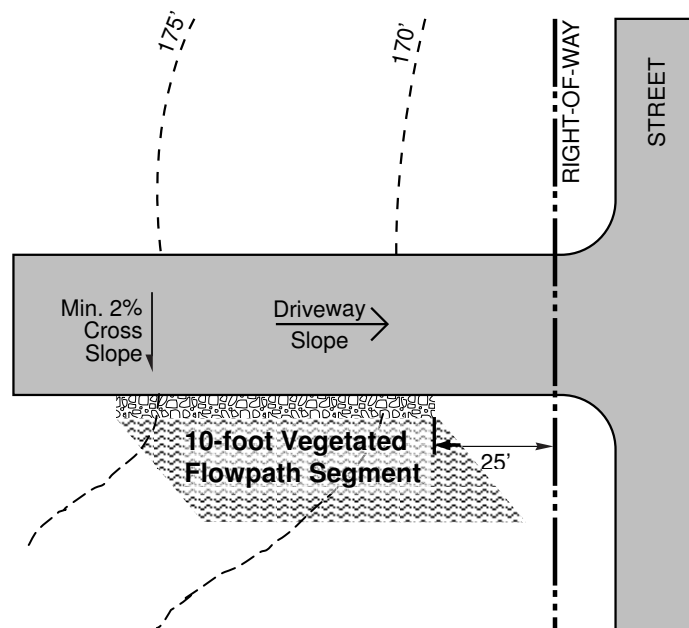
Design Specifications

1. No more than 700 square feet of impervious surface may be drained to a single rock pad unless the native vegetated flowpath segment is longer than the 100-foot minimum length specified in Minimum Requirement 3 of Section C.2.1.1 above. If the developed surface is non-native pervious surface other than pasture, no more than 2,500 square feet may be drained to a single rock pad with a 100-foot native vegetated flowpath segment. For pasture, the maximum is 8,000 square feet. Combinations of different surfaces draining to a single rock pad are allowed provided that the sum of each surface area divided by its maximum (e.g., impervious area divided by 700) is less than or equal to 1.0.
2. A maximum impervious surface area of 1,400 square feet may be drained to a single rock pad if the native vegetated flowpath segment is at least 200 feet in length. For non-native pervious surface other than pasture, the maximum area is 5,000 square feet. For pasture, the maximum is 16,000 square feet. Again, combinations of different surfaces are allowed as explained in Item 1 above.
3. For impervious surface areas of between 700 and 1,400 square feet, the length of the flowpath segment may vary proportionally between 100 and 200 feet. This variation is also allowed for non-native pervious surfaces (i.e., between 2,500 and 5,000 square feet for surfaces other than pasture, and between 8,000 and 16,000 square feet for pasture).
4. For purposes of maintaining adequate separation of flows discharged from adjacent dispersion devices, the native vegetated flowpath segment for the rock pad must have at least 50 feet of separation from an adjacent flowpath segment at the downstream end of whichever segment is the shorter. **Exception:** where sheet flow from a non-native pervious surface overlaps with the flowpath

FIGURE C.2.4.D EXAMPLES OF BASIC DISPERSION FOR DRIVEWAYS

**PLAN**

Driveway Dispersion Trench
Driveway Slope Varies and Slopes Toward Street

**PLAN**

Sheet Flow Dispersion from a Driveway
Flat to Moderately Sloping Driveways

C.2.5 RAIN GARDEN

Rain gardens, also known as "**bioretention**," are excavated or otherwise formed depressions in the landscape that provide for storage, treatment, and infiltration of stormwater runoff. The soil in the depression is enhanced to promote infiltration and plant growth. Plants adapted to wet conditions are planted in the enhanced soil. Figure C.2.5.A (p. C-58) shows a plan view and section of a typical rain garden system.

Applicable Surfaces

Subject to the minimum design requirements and specifications in this section, rain gardens may be applied to any impervious surface such as a roof, driveway, parking area, road, or sidewalk, and to any non-native pervious surface such as a lawn, landscaped area, or pasture.

Design Considerations

Rain gardens may overflow occasionally in large storm events or more frequently if located in very poorly drained soils or areas with very high water tables. In very well-drained soils, water may drain too quickly to support water loving plants and ponding may be of short duration. Conditioning the soil in the rain garden with abundant compost will enhance the growth of plants and help the soil to more readily admit water.

Operation and Maintenance

See Section C.2.5.3 (p. C-60).

C.2.5.1 MINIMUM DESIGN REQUIREMENTS

All of the following requirements must be met in order for a rain garden to be applicable to a **target impervious surface** or **new pervious surface**:

1. A **minimum water storage volume** equivalent to 3 inches (0.25 feet) of runoff depth from the impervious surface area served is required. In other words, the volume in cubic feet shall equal 0.25 times the square footage of the impervious surface area served (see example calculation in Section C.2.5.2 below). For rain gardens serving **new pervious surface**, a minimum water storage volume equivalent to 0.5 inches (0.04 feet) of runoff depth is required.
2. The **water storage area**, containing the minimum required storage volume, shall be 12 inches deep at overflow and have side slopes no steeper than 3 horizontal to 1 vertical. The overflow point of the water storage area shall be at least 6 inches below any adjacent pavement area. The overflow point must be situated so that overflow does not cause erosion damage or unplanned inundation.
3. If a **containment berm** is used to form the water storage area, the berm must be at least 2 feet wide and 6 inches above the 12 inches of water depth. A **catch basin** or **rock pad** must be provided to release water when the pond's water level exceeds the 12 inches of water depth. The catch basin may discharge to the local drainage system or other acceptable discharge location via a 4-inch rigid pipe. The rock pad may be used with or without a constructed drainage system downstream. If a rock pad is used, it must be composed of crushed rock, 6-inches deep and 2 feet wide (perpendicular to flow) and must extend at least 4 feet or beyond the containment berm, whichever is greater. The rock pad must be situated so that overflow does not cause erosion damage or unplanned inundation.
4. **Amended soil** consisting of minimum of 4 inches of compost tilled into the upper 12 inches of soil or 12 inches of imported sand/compost blend having 8 to 13% organic material by dry weight is required in the rain garden. Tilling and amending to greater depth is desirable.
5. **Water tolerant plants** such as those in Table C.2.5.A shall be planted in the pond bottom. Plants native to Western Washington are preferred.